

# Rebuttal Report for Jefferson County, Alabama 2021 Redistricting Plan

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DEFENSE TRIAL  
EXHIBIT

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# 1 Introduction and Qualifications

My qualifications and curriculum vitae are included in my original report that I submitted on April 12, 2024.

While the various rebuttal reports contain a number of additional analyses and critiques, the opinions I expressed in my original report remain unchanged that there is not evidence that the 2021 Enacted Map was drawn with race as the predominant factor. While I reserve the right to offer opinions related to all of the rebuttal reports, I focus on particularly new analyses and illustrative plans introduced by the plaintiffs’ experts in their various rebuttal reports and discussed further in their depositions.

Dr. McCartan produces a new set of simulations with higher core retention scores that, in many cases, resemble the population retention of the 2021 Enacted Map. He also produces a new set of illustrative maps.

Mr. Cooper produces two additional illustrative maps on May 5, 2024.

Dr. Liu produces an alternative regression model for District 1 but not District 2 that varies the model specification from a regression model included in my original report.

## 2 Core Retention, Strong Simulations

In my original report I stated that “When creating the simulations I attempted to instruct the computer to prioritize the boundaries of the 2013 districts in a variety of different ways. In each case, the algorithm could not produce a representative set of maps that could perform as well as the enacted map on this metric. One reason for this is that there are simply not that many ways in which a person could draw a map that retains the 2013 district populations as well as the enacted map does. Because of this, the redistricting algorithm struggles to produce a large number of maps that meet this criteria. This illustrates the degree to which the enacted map prioritized retention of the 2013 districts” (Barber original report, pg 49). The reason that I did not produce this simulation set was because the computer

algorithm produces a “low plan diversity” warning as part of the simulation output. In ongoing redistricting litigation in Louisiana, Dr. McCartan criticized the simulations in one portion of my report for this same warning (*Nairne v. Ardoin*, No. 3:22-cv-178 (M.D. La.)). To avoid the same criticism in this litigation, I avoided relying on a core retention simulation ensemble with a “low plan diversity” warning. Dr. McCartan then produced a report on April 26, 2024, and relied on a core retention simulation set, prioritizing core retention as I had, that produced this exact “low plan diversity” warning. I understand Dr. McCartan has since testified that this warning is what he considers a “false positive” for purposes of this litigation and that he has no objection to my relying on the “core retention, strong” simulation set that he produced.

Moreover, his rebuttal report puts forward six additional illustrative maps. Mr. Cooper’s rebuttal report, dated April 26, 2024, which I received on May 5, 2024, also contains two additional illustrative maps (Cooper Illustrative maps D and E). To facilitate comparisons between these illustrative maps and the “core retention, strong” simulations produced by Dr. McCartan, Table 1 shows results similar to Table 2 of Dr. McCartan’s rebuttal report and places the BVAP of each district in the illustrative maps and the Enacted Map within the distribution of these simulations.

The results of the table show that when simulations account for high core retention, as in the Enacted Map, the Enacted Map is not a statistical outlier in four of the five districts and every district in the Enacted Map is within the range of the simulations. The Enacted Map is also much less an outlier than any of the illustrative maps. In every single illustrative map, at least four of the five districts is more extreme than the Enacted Map when compared to the simulations, and every plaintiff map contains at least one illustrative district that is more extreme than every single corresponding district in the 120,000 simulations produced by Dr. McCartan. Furthermore, the McCartan 3 illustrative plan falls outside the range of the simulations for every single district. The Cooper B and C maps and the McCartan 5 map are outside the range of the simulations for four of the five districts.

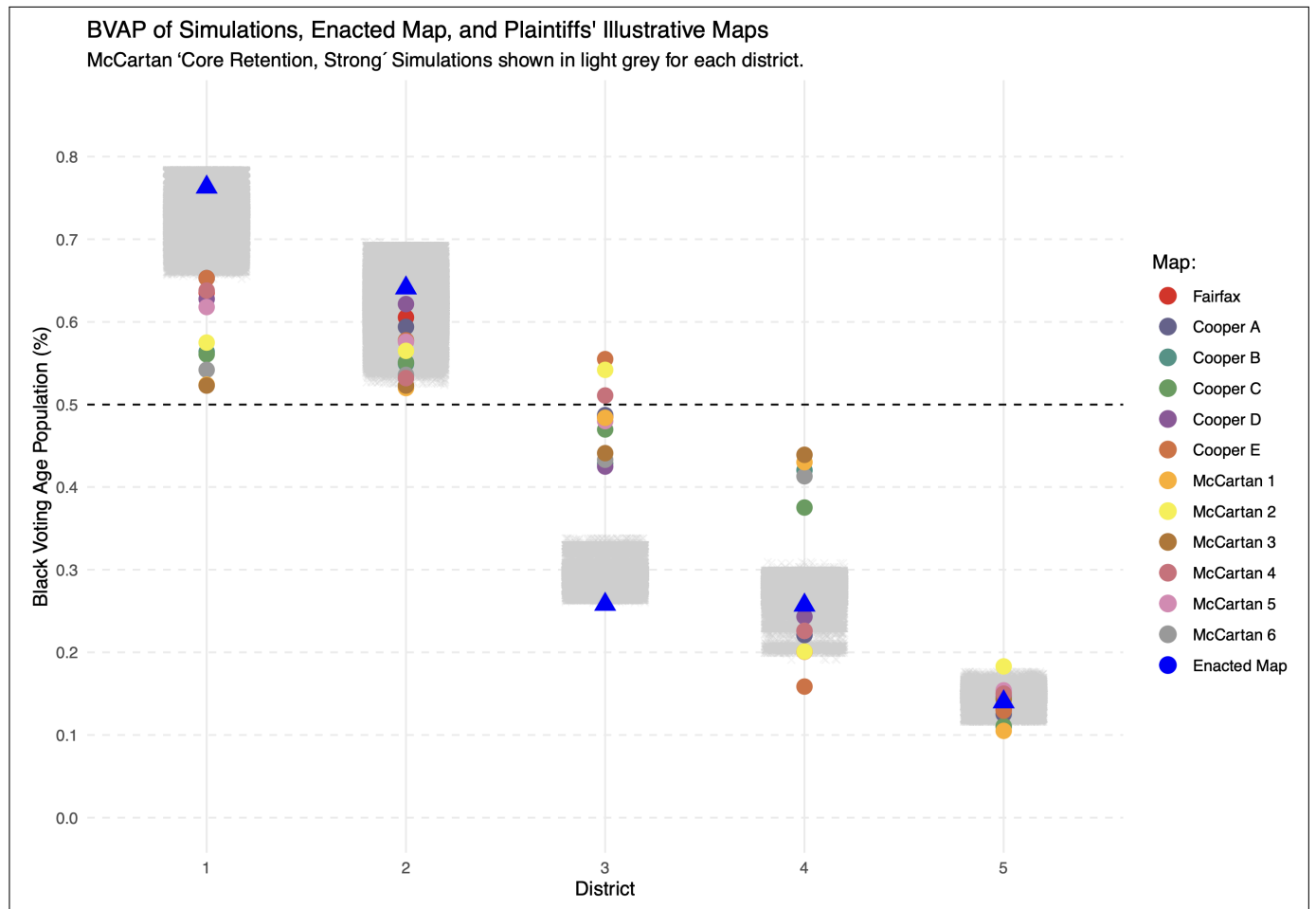
Overall, a striking pattern occurs when looking at the illustrative maps. The districts in the two right-most columns (the highest and 2nd-highest BVAP districts) often have very low numbers (indicating lower BVAPs than the vast majority of corresponding districts in the simulations) while the 3rd-highest districts all score 100%, meaning that these districts all have higher BVAP than every single one of the corresponding districts in Dr. McCartan’s simulations. This is clear evidence that plaintiffs’ experts put forward maps that prioritized racial criteria over the race-neutral criteria considered by the commission (including core retention). The illustrative maps artificially lower the BVAP of the highest district (and sometimes the 2nd-highest BVAP district) so as to increase the BVAP of the 3rd-highest BVAP district. Figure 1 below illustrates this pattern very clearly.

Table 1: Summary of Racial Statistics for Enacted Map and Illustrative Maps compared to McCartan “Core Retention, Strong” simulation set.

Core retention, strong	Percent of simulations with lower BVAP than district				
	5th-highest	4th-highest	3rd-highest	2nd-highest	Highest
Fairfax	<b>5.8</b>	<b>0.09</b>	<b>100</b>	<b>19.9</b>	<b>0</b>
Cooper A	<b>5.4</b>	<b>0.93</b>	<b>100</b>	<b>14.6</b>	<b>0.002</b>
Cooper B	<b>0</b>	<b>100</b>	<b>100</b>	<b>1.59</b>	<b>0</b>
Cooper C	<b>0</b>	<b>100</b>	<b>100</b>	<b>1.96</b>	<b>0</b>
Cooper D	36.9	<b>2.66</b>	<b>100</b>	<b>53.7</b>	<b>0</b>
Cooper E	<b>5.7</b>	<b>0</b>	<b>100</b>	<b>7.98</b>	<b>0.002</b>
McCartan Plan 1	20.8	<b>100</b>	<b>100</b>	<b>0.14</b>	<b>0</b>
McCartan Plan 2	<b>89.8</b>	<b>1.02</b>	<b>100</b>	<b>7.64</b>	<b>0</b>
McCartan Plan 3	<b>0</b>	<b>100</b>	<b>100</b>	<b>0</b>	<b>0</b>
McCartan Plan 4	<b>100</b>	<b>0.09</b>	<b>100</b>	<b>5.52</b>	<b>0</b>
McCartan Plan 5	12.4	<b>100</b>	<b>100</b>	<b>0</b>	<b>0</b>
McCartan Plan 6	83.5	<b>1.0</b>	<b>100</b>	<b>0.06</b>	<b>0</b>
Enacted Plan	11.6	22.1	1.5	50.4	90.7

Note: Each number shows the percent of simulations that have a lower BVAP than the corresponding district in each map. For example, in the Cooper A Map, the “Highest” BVAP district is an outlier and has a lower BVAP than all but 0.002% of the corresponding districts in Dr. McCartan’s simulation set. The 3rd-highest BVAP district in *every* illustrative plan is an extreme outlier. Every 3rd-highest BVAP district in the illustrative maps has a higher BVAP than every single 3rd-highest district in all 120,000 simulations. Bolded numbers are districts that are more extreme relative to the simulations, compared to the Enacted Map.

Figure 1: Racial Composition of Districts compared to Simulations



### 3 Liu Report

Dr. Liu produces an alternative regression model that interacts the BVAP and adjacency variables for precincts that were moved into District 1. He does this to test the relationship between race and movement into District 1 among only the adjacent precincts. While I do not think this particular model specification tests the question of racial predominance correctly, it is notable that he produces no such regression model for District 2. It is my understanding that Dr. Liu has since testified that he ran out of time to run this regression model. When I replicate Dr. Liu's preferred analysis, the interaction variable is not significant and the BVAP variable also remains statistically insignificant, indicating that even when using Dr. Liu's preferred model specification, race is not a statistically significant predictor of precinct movement into District 2.

Table 2

	<i>Dependent variable:</i>
	Precinct Moved Into CD-2
Total Population (in 1,000s)	−0.018** (0.008)
Black VAP%	0.0001 (0.001)
Precinct Adjacent to Old CD-2	0.285*** (0.083)
Precinct Adjacent to Old CD-2 x Black VAP%	−0.002 (0.001)
Constant	0.084** (0.042)
Observations	147
Adjusted R <sup>2</sup>	0.143
<i>Note:</i>	
*p<0.1; **p<0.05; ***p<0.01	

I, Dr. Michael Barber, acting in accordance with 28 U.S.C. § 1746, Federal Rule of Civil Procedure 26(a)(2)(B), and Federal Rules of Evidence 702 and 703, hereby declare that the foregoing is true and accurate to the best of my knowledge

A handwritten signature in black ink, appearing to read "Michael Barber", written in a cursive style.

Michael Barber

May 14, 2024